Goals

- Problem-solve with the prototype and its various count issues

- Create a chart of the expected number of photoelectrons that the prototype should result in

Equation

$$N_e = HL\left(1 - \frac{1}{\beta^2 n^2}\right)\frac{\varepsilon}{1 - M(1-\varepsilon)}$$

Ne = number of photoelectrons

H = figure of merit

L = thickness of aerogel

β = velocity

n = index of refraction

ε = aerial fraction surface

M = reflectivity

Results

5 cm of aerogel

Epsilon of .14

# of PE	QE = 13.2%	QE = 22%	QE = 40%
-61.9	-8.2	-13.6	-24.8
-17.5	-2.3	-3.8	-7.0
-5.1	-0.7	-1.1	-2.0
0.0	0.0	0.0	0.0
2.7	0.4	0.6	1.1
4.2	0.6	0.9	1.7
5.1	0.7	1.1	2.1
5.8	0.8	1.3	2.3
6.2	0.8	1.4	2.5
6.4	0.8	1.4	2.6
7.4	1.0	1.6	2.9
7.7	1.0	1.7	3.1
7.9	1.0	1.7	3.1
8.0	1.1	1.8	3.2
8.0	1.1	1.8	3.2
8.1	1.1	1.8	3.2

Results

8 cm of aerogel

Epsilon of .14

# of PE	QE = 13.2%	QE = 22%	QE = 40%
-84.9	-11.2	-18.7	-34.0
-23.9	-3.2	-5.3	-9.6
-7.0	-0.9	-1.5	-2.8
0.0	0.0	0.0	0.0
3.6	0.5	0.8	1.5
5.7	0.8	1.3	2.3
7.0	0.9	1.5	2.8
7.9	1.0	1.7	3.2
8.6	1.1	1.9	3.4
8.8	1.2	1.9	3.5
10.1	1.3	2.2	4.0
10.6	1.4	2.3	4.2
10.8	1.4	2.4	4.3
10.9	1.4	2.4	4.4
11.0	1.5	2.4	4.4
11.1	1.5	2.4	4.4

Results

10 cm of aerogel

Epsilon of .14

# of PE	QE = 13.2%	QE = 22%	QE = 40%
-99.1	-13.1	-21.8	-39.6
-27.9	-3.7	-6.1	-11.2
-8.2	-1.1	-1.8	-3.3
0.1	0.0	0.0	0.0
4.2	0.6	0.9	1.7
6.7	0.9	1.5	2.7
8.2	1.1	1.8	3.3
9.3	1.2	2.0	3.7
10.0	1.3	2.2	4.0
10.3	1.4	2.3	4.1
11.8	1.6	2.6	4.7
12.3	1.6	2.7	4.9
12.6	1.7	2.8	5.0
12.7	1.7	2.8	5.1
12.8	1.7	2.8	5.1
12.9	1.7	2.8	5.2

Results

5 cm of aerogel

Epsilon of .8

# of PE	QE = 13.2%	QE = 22%	QE = 40%
-346.8	-45.8	-76.3	-138.7
-97.8	-12.9	-21.5	-39.1
-28.6	-3.8	-6.3	-11.4
0.2	0.0	0.0	0.1
14.9	2.0	3.3	5.9
23.4	3.1	5.1	9.3
28.7	3.8	6.3	11.5
32.4	4.3	7.1	13.0
34.9	4.6	7.7	14.0
36.0	4.7	7.9	14.4
41.2	5.4	9.1	16.5
43.2	5.7	9.5	17.3
44.1	5.8	9.7	17.6
44.6	5.9	9.8	17.8
44.9	5.9	9.9	18.0
45.2	6.0	9.9	18.1

Results

8 cm of aerogel

Epsilon of .8

# of PE	QE = 13.2%	QE = 22%	QE = 40%
-475.7	-62.8	-104.6	-190.3
-134.1	-17.7	-29.5	-53.6
-39.2	-5.2	-8.6	-15.7
0.2	0.0	0.1	0.1
20.4	2.7	4.5	8.1
32.0	4.2	7.0	12.8
39.4	5.2	8.7	15.8
44.4	5.9	9.8	17.8
47.9	6.3	10.5	19.2
49.3	6.5	10.8	19.7
56.6	7.5	12.4	22.6
59.2	7.8	13.0	23.7
60.5	8.0	13.3	24.2
61.2	8.1	13.5	24.5
61.6	8.1	13.6	24.7
61.9	8.2	13.6	24.8

Results

10 cm of aerogel

Epsilon of .8

# of PE	QE = 13.2%	QE = 22%	QE = 40%
-555.0	-73.3	-122.1	-222.0
-156.5	-20.7	-34.4	-62.6
-45.7	-6.0	-10.1	-18.3
0.3	0.0	0.1	0.1
23.8	3.1	5.2	9.5
37.4	4.9	8.2	15.0
46.0	6.1	10.1	18.4
51.8	6.8	11.4	20.7
55.9	7.4	12.3	22.4
57.5	7.6	12.7	23.0
66.0	8.7	14.5	26.4
69.1	9.1	15.2	27.6
70.6	9.3	15.5	28.2
71.4	9.4	15.7	28.6
71.9	9.5	15.8	28.8
72.3	9.5	15.9	28.9